

REMARKS

After entry of the present amendment, claims 1 through 17 will be pending in the application with claims 1, 11, 14, 15, 16 and 17 written in independent form. Claims 1, 2, 5 through 9, and 11 have been amended. New claims 14 through 17 have been added without introduction of a new matter to the claims.

Specification

The Examiner objected to the disclosure due to several informalities. The applicant has amended the disclosure as suggested by the Examiner and check the specification to determine presence of minor informalities. The amendments to the specification are made in accord with MPEP 2163.06, to merely clarify the embodiments described therein.

Drawings

The Examiner objected to the drawings for failure to comply with 37 CFR 1.121 (b) the Applicant has designated Figures 4A-4E by adding –Prior Art--. The applicant has amended the specification to render the Examiner's objection to Figure 1B moot. Each of the replacement sheet is labeled “Replacement sheet” to comply with 37 CFR 1.84(c).

Claims

Claims Rejections under 35 USC 112

Claims 1, 2, 5 through 9, 11, and 12 stand rejected under 35 USC 112, second paragraph for failure to particularly point out and distinctly claim the subject matter as the applicant regards as his invention. The applicant has amended claims 1, 2, 5 through 9, 11, and 12 to render this rejection moot.

Claims Rejections under 35 USC 102 and 103

Claims 1 through 3 and 11 through 12 stand rejected under 35 USC 102 (e) as being anticipated by the United States Patent No. 6,342,434 to Miyamoto et al. (the ***Miyamoto Reference***). Claim 4 stand rejected under 35 USC 103 (a) as being unpatentable over the ***Miyamoto Reference*** in view of the United States Patent No. 5,874,784 to Aoki et al. (the ***Aoki Reference***).

The *Miyamoto Reference* discloses a method of thinning a semiconductor wafer by using a reinforcing member (carrier 1) formed of a disk-shaped member (base 1a) and an adhesive member (suction pad 1b). The carrier 1 is attached on one surface of the semiconductor wafer, and the other surface of the semiconductor wafer is thinly processed by wet etching. The carrier 1 is used for preventing cracks or warps that might be produced in the semiconductor wafer in the etching process. Further, the carrier 1 reinforcing the semiconductor wafer is formed of the disk-shaped base 1a and the suction pad 1b formed of an elastically flexible material. The carrier 1 is pressed against the semiconductor wafer and the region enclosed by the semiconductor wafer, the base 1a, and the suction pad 1b is depressurized, thereby the carrier 1 is adhered to the semiconductor wafer. Accordingly, one surface of the semiconductor wafer to which the carrier 1 is adhered is covered by the carrier 1. Further, since the carrier 1 enhances the strength of the semiconductor wafer during wet etching, the suction pad 1b needs to be resistable to wet etching.

The Applicant's invention presents a method for manufacturing a semiconductor device adaptable for adhering a ring-shaped reinforcing member to one surface of a semiconductor wafer thinly processed with an adhering material, and forming a metallic film on the other surface of the semiconductor wafer, which is exposed through an opening of the ring-shaped reinforcing member. The adhering material of the present invention presents a material which changes its state at temperature higher than a processing temperature in the step of forming the metallic film. The step of using the reinforcing member with an opening defined therein enhances the strength of the semiconductor wafer and allows to form a metallic film on the semiconductor wafer through the opening.

Alluding to the above, the step of using the material which changes its state at temperature higher than the processing temperature in the step of forming the metallic film as the adhering material, allows to adhere the reinforcing member to the semiconductor wafer as the metallic film is formed and allows to reduce the quality of the metallic film due to volatilization of the adhesive material. Furthermore, the reinforcing member formed in the shape of the ring-shape having the opening defined therein to expose one surface of the semiconductor wafer allows to form the metallic film on the one surface of the semiconductor wafer. By using this reinforcing member, it is possible to enhance the strength of the semiconductor wafer, and to form the metallic film even on the surface of the semiconductor wafer to which the reinforcing member is adhered.

As amended, the Applicant invention is different from the *Miyamoto reference* because the Applicant's invention uses a reinforcing member in the step of forming a metallic film on a semiconductor wafer which is thinly processed in advance, while *Miyamoto reference* uses the

reinforcing member in the step of thinning the semiconductor wafer. In addition, the reinforcing member of the *Miyamoto reference* presents a disk-shaped member, wherein one surface of the semiconductor wafer to which the reinforcing member is attached is covered by the reinforcing member. Accordingly, no metallic film can be formed on the one surface of the semiconductor wafer to which the reinforcing member is attached. Since the *Miyamoto reference* does not teach or suggest expressly or impliedly a step of forming a metallic film, the adhesive material for the reinforcing member is not required to have a property of changing its state at equal to or higher than a temperature that is higher than the processing temperature in a step. It is apparent that the property required for the adhesive material of the *Miyamoto reference* is completely different from that of the present invention. Accordingly, the present invention cannot be conceived from the teachings of the *Miyamoto reference* and claim 1, as amended by the Applicant should be allowed.

Turning now to claim 11, the applicant believes that the reinforcing member of the present invention has an opening, therefore a metallic film can be formed on one surface of the semiconductor wafer to which the reinforcing member is adhered. However, according to *Miyamoto reference*, the carrier 1 and the semiconductor wafer are adhered by pressing the carrier 1 against the semiconductor wafer to depressurize the region enclosed by the base 1a, the suction pad 1b, and the semiconductor wafer. Thus, one surface of the semiconductor wafer is covered by the carrier 1. Further, the carrier 1 does not have an opening. Therefore, it is impossible to form a metallic film on a surface of the semiconductor wafer to which the carrier 1 is adhered through the carrier 1. Accordingly, the present invention cannot be conceived from Miyamoto, and claim 11 as amended by the Applicant, should also be allowed.

Turning now to claim 4, the rejection of this claim is moot in light of the amendments to claim 1. Claims 5 through 9 have been rejected under 35 USC 112 and claims 10 and 13 have not been rejected by the Examiner. The Applicant incorporated limitation of claim 5, claim 3 to which claim 5 depends upon and claim 1, to which claim 3 depends upon and added a new independent claim 14 which includes the limitations of claims 1, 3, and 5. The Applicant has also incorporated limitation of claim 10, claim 3 to which claim 10 depends upon and claim 1, to which claim 3 depends upon and added a new independent claim 15 which includes the limitations of claims 1, 3, and 10. In addition, the Applicant incorporated limitation of claim 13, claim 12 to which claim 13 depends upon and claim 11, to which claim 12 depends upon and added a new independent claim 16 which includes the limitations of claims 11, 12, and 13.

The Applicant believes the application is now in condition for allowance, which allowance is respectfully solicited. The fee for the additional independent claims is submitted herewith. Applicant believes that no additional fees are required, however, the Commissioner is authorized to charge our Deposit Account No. 08-2789 in the name of Howard & Howard Attorneys for any additional fees or credit the account for any overpayment.

Respectfully submitted,

HOWARD & HOWARD ATTORNEYS

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